

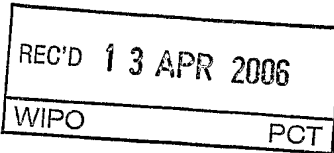
## PATENT COOPERATION TREATY


## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 63549A		<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. PCT/US2005/006224		International filing date (day/month/year) 25.02.2005	Priority date (day/month/year) 25.02.2004	
International Patent Classification (IPC) or national classification and IPC INV. B01D63/12				
Applicant DOW GLOBAL TECHNOLOGIES, INC.				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 12 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand  08.12.2005		Date of completion of this report  13.04.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized officer  Lançon, E  Telephone No. +31 70 340-		



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2005/006224

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3 and 23.1(b))
    - ☐ publication of the international application (under Rule 12.4)
    - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-22 as originally filed

**Claims, Numbers**

1-31 as originally filed

**Drawings, Sheets**

1/4-4/4 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
    - ☐ the description, pages
    - ☐ the claims, Nos.
    - ☐ the drawings, sheets/figs
    - ☐ the sequence listing (*specify*):
    - ☐ any table(s) related to sequence listing (*specify*):
  4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
    - ☐ the description, pages
    - ☐ the claims, Nos.
    - ☐ the drawings, sheets/figs
    - ☐ the sequence listing (*specify*):
    - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
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**Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 25,26,28,31

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 25,26,28,31 are so unclear that no meaningful opinion could be formed (*specify*):

**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 25,26,28,31

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

**INTERNATIONAL PRELIMINARY REPORT  
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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-24,27,29,30
	No: Claims	
Inventive step (IS)	Yes: Claims	1-24,27,29,30
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-24,27,29,30
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item III.**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1.

The application does not meet the requirements of Article 6 PCT, because **claims 25, 26, 28 and 31** are not clear.

1.1

**Claims 25,26 and 28** are apparatus claims that refer to a process claim (i.e. claim 15)

1.2

The reference of dependent claim 31 is unclear, as said process claim refers to an apparatus claim.

1.3

Therefore no search has been carried out for claims 25, 26, 28 and 31.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following document/s/:

D1: US-A-4 046 685 (BRAY ET AL) 6 September 1977 (1977-09-06)

D2: WO 03/039708 A (IONICS, INCORPORATED; ARNOLD, JOHN, W; ELYANOW, IRVING, D; CARSON, WIL) 15 May 2003 (2003-05-15)

1.1

With respect to the clarity objections raised under **Item VIII**, document D1 is regarded as being the closest prior art to the subject-matter of **claim 1** and shows (the

references in parentheses applying to this document):

An apparatus for purifying water (Abstract) comprising:  
a pressure vessel having opposing inlet and outlet ends (Claim 1), and  
enclosing at least three spiral-wound elements (Claim 3), each spiral-wound  
element having a feed water channel and a permeate collection tube (Figure 1;  
col.2, l.51 - col.3, l.66), where the spiral wound elements are connected in  
series coaxially within the filtration pressure vessel (Fig. 1; Claim 3);  
The elements in series further comprise:  
a lead element with an inlet in communication with the inlet of the filtration  
pressure vessel (Fig. 1; col.2, l.51 - col.3, l.66);  
an intermediate element connected to an upstream element and a downstream  
element so that the intermediate element is supported and aligned axially within  
the filtration pressure vessel (claim 3);  
and a tail element with an exit port in communication with the outlet end of the  
filtration pressure vessel (Fig. 1; col.2, l.51 - col.3, l.66)

The subject-matter of claim 1 differs from this known apparatus for purifying water in  
that the spiral-wound elements in the pressure vessel of document D1 are preferably  
of the same type (col. 6, l.48-51) and have therefore no different standard specific  
fluxes as required by claim 1 of present invention.

## 1.2

Document D2 also discloses part of the features of **claim 1** of present application  
(the references in parentheses applying to this document):

An apparatus for purifying water (p.1, l.2) comprising:  
a pressure vessel enclosing several spiral-wound elements (p.11, l.3-4), each  
spiral-wound element having a feed water channel and a permeate collection  
tube (p. 13, l.27 - p.14, l.13), where the spiral wound elements are connected in  
series coaxially within the filtration pressure vessel (Fig. 1);  
The elements in series further comprise:  
a lead element with an inlet in communication with the inlet of the filtration  
pressure vessel (Fig. 1; p.16, l. 19-p.17, l.11);

an intermediate element connected to an upstream element and a downstream element so that the intermediate element is supported and aligned axially within the filtration pressure vessel (Fig. 1);  
and a tail element with an exit port in communication with the outlet end of the filtration pressure vessel (Fig. 1)

The subject-matter of claim 1 differs from this known apparatus for purifying water in that the spiral-wound elements are not said to have different characteristics resulting in a ranking of standard specific fluxes.

The subject-matter of **claim 1** is therefore **new** (Article 33(2) PCT).

2.

In order to examine **claim 1** of present application in terms of inventivity (Article 33(3) PCT) the problem to be solved by the present invention may be regarded as providing an apparatus for purifying water which allows a more even distribution of flux within the pressure vessel.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the reason that neither in document D1 or D2, nor in the available prior art documents a hint is given as to the use of filtration elements within a pressure vessel having distinct standard specific fluxes in a relationship as claimed in present application.

As for carrying out present invention, specific tests would have to be carried out related to the specific flux of the different filtration elements within a pressure vessel, it would not be obvious to a person skilled in the art to apply the solution proposed in claim 1 to modify the apparatus of documents D1 or D2 in such a way as to solve the technical problem.

Therefore the subject-matter of **claim 1** is considered to be **inventive** (Article 33(3) PCT)

3.

**Claims 2-14** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

4.

Taking into account the clarity objections raised under **Item VIII**, document D1 can be considered as the closest prior art to the subject-matter of claim 15. Document D1 shows (the references in parentheses applying to this document):

A process for purifying water (Abstract) comprising the steps of:  
flowing a feed solution through a filtration pressure vessel containing at least three spiral wound elements in series (Claim 1,3), the elements in series including a lead element proximate to the feed inlet end of the vessel(Fig. 1; col.2, l.51 - col.3, l.66) and a downstream element (Fig. 1; col.2, l.51 - col.3, l.66);  
applying filtration pressure to the feed solution (col. 3, l. 58-60);  
removing permeate and concentrate solutions from the vessel (Fig. 1).

The subject-matter of claim 15 differs from this known process for purifying water in that the spiral-wound elements used during said process are not said to have different characteristics resulting in graded standard specific fluxes.

The subject-matter of **claim 15** is therefore **new** (Article 33(2) PCT).

5.

The problem to be solved by the present invention may be regarded as providing a process for purifying water which increases the vessel productivity, the recovery and decreases the requirement for applied pressure by using an apparatus with more even distribution of flux within the pressure vessel.

As described in 2. it would not be obvious to a skilled person to apply the solution of claim 15 to a process as described in document D1.

Therefore, the subject-matter of **claim 15** is considered as involving an **inventive step** (Article 33(3))

6.

**Claims 16-24** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.



**Re Item VIII.**

1.

The application does not meet the requirements of Article 6 PCT, because claim 1 is not clear.

1.1

The features listed as "optional" features are not considered during the search.

1.2

It is not clear from part c. of Claim 1 how permeate water could be withdrawn from said outlet from "more than one" element, as these elements are said to be connected in series.

It is further not clear from part c. of Claim 1, how the permeate water and the residual feed water (concentrate) are separately withdrawn at the exit port of the pressure vessel.

1.3

The terms "maximum standard specific flux" and "minimum standard specific flux" are not clear and leave the reader in doubt whether these boundary values could never be exceeded or whether the standard specific flux values of each spiral-wound element should simply differ, resulting in a ranking of standard specific flux values, including obviously a greatest and a lowest value.

1.4

No link has been established between the assembly order of the spiral-wound elements and the different values of standard specific flux of each of the elements, so that none of the values can be attributed to one of the specific element (i.e. lead, tail or intermediate element).

1.5

Claim 1 does further not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The functional statements

concerning the values of and relations between the standard specific fluxes do not enable the skilled person to determine which technical features are necessary to perform the stated functions.

2.

The application does not meet the requirements of Article 6 PCT, because claims 6, 8, 9, 10, 13 are not clear.

2.1

Claim 6 defines a feed spacer cross sectional area of an apparently new feature of the spiral-wound element, the feed spacer, which hasn't been defined in any earlier claim.

2.2

The terms "greater than about" used in claim 8 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claim/s unclear, Article 6 PCT.

2.3

Claims 9 and 10 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

2.4

The subject-matter of claim 13 is not clear, as it cannot be concluded from the description of the claim, where the permeate of the intermediate elements, described in claim 1, flows.

3.

The application does not meet the requirements of Article 6 PCT, because claims 15 and 29 are not clear.

3.1

The matter for which protection is sought in claim 15 is not clearly defined. The functional statements concerning the value of the osmotic filtration pressure do not enable the skilled person to determine which technical features are necessary to perform these functions.

3.2

Claim 29 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The functional statements concerning the relation between the difference in applied pressure and osmotic pressure at the inlet and the outlet of the vessel do not enable the skilled person to determine which technical features are necessary to perform the stated functions.

3.3

With respect to 3.1 and 3.2 it is to be remarked, that although claims 15 and 29 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/US2005/006224

